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## AN URGENT NEED TO ANALYZE THE REGULATIONS OVER THE FLOOD PREVENTION AND PROTECTION IN POLAND\*\*

The recent flood of July 1997 and serious losses caused by inundations, specially in the catchment area of the Odra River, concentrated our attention on the flood control and prevention oriented to the reduction of flood risk. That may be achieved by rational policy of area development and by effective and proper flood control. Effectiveness of the prevention and protection against flood depends on regulations and the strategy of area development. Actual environment legislation is described and the need to analyze and transform legal system justified.

The paper describes an actual interpretation of flood prevention and protection in Polish regulations. Many acts are discussed and the urgent need to analyze them comprehensively is justified. Questions about flood control, prevention and also rescue activities aimed to reduce the risk of inundation and flood losses are considered. This is done with reference to the concepts formulated in documents of the World Conference on Natural Disaster Reduction organized in May of 1994 in Yokohama under the auspices of the United Nations.

### 1. INTRODUCTION

Overbank stages and floods are natural phenomena inseparably connected with environment of surface waters and associated with variability of water levels and river flows. Those seasonal and short-term occasional overbank stages are so critical in comparison to normal water levels that they have to cause serious problems within wide areas of river valleys. Such a situation can be illustrated by the difference between maximal flood-wave culmination and mean water level which in Cracow reaches ca 8.5 m, in Warsaw 5 m and in Tczew 8 m. For European rivers these differences are as follows: for Garonne 12 m, for Seine 5 m, and for Rhine 6.5-9 m. The above values are not maximal, e.g., for Mississippi this difference reaches 18 m and

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\*\* All comments on legal regulations have to be treated as author's interpretation, not as presentation of official regulations.

as the record we can mention the Parana River (the second river of South America) with the difference of 40 m [8].

So critical, abnormal overbank stages in river flow in the circumstances of intensive development of river valley area cause overflows and serious damages to inhabitants and regional economy. Historical sources give numerous descriptions of flood disaster, e.g. a monograph *History of floods in the catchment of the Upper Vistula* by Adam BIELAŃSKI [1], published at the Cracow Technical University, and also the paper of Zdzisław MIKULSKI in *Gospodarka Wodna* (November 1997) [4].

The term *flood* means an overbank stage, in which water levels exceed the height of river bank or dikes or when river embankments are damaged, thus the river valley areas are inundated. The causes of floods (heavy rains, sudden snow melting, river ice jams) are beyond our control; moreover, predicting of those events is not accurate, since we are not able to estimate reliably danger and losses, which may happen. Losses and damages caused by floods are very serious. With intensive management of river valley areas – when they are nearby to river, their suitable location is used for industry, agriculture and settlements – the flood losses become heavier and heavier. This general estimation is not changed by the difficulty in expressing the mentioned losses in financial and economical measures, especially when the following elements are considered:

health hazard, loss to life, damage to the property, goods, possessions and livestock of inhabitants, interruptions in economic activity, communication and transport, damage to buildings and buildings of cultural and historical value, damages to landscape and environment, etc., and also devastation of river channel and its protective embankments.

## 2. SCOPE OF FLOOD CONTROL

This general description of flood danger, damage and losses – strengthened by the last flood of July 1997 – may be interpreted as sufficient to intensify some protective activities. The range of risk, extent of losses and their variety imply a flood control, which is realized in two domains [11]:

**1. Prevention.** This means activities which allow us to reduce a flood hazard within drainage catchment.

**2. Protection,** often called a “direct” protection. Due to this such a kind of protection some undertakings are carried out during flood or overbank stages. They should reduce both range and extent of inundation and save us from damage.

In the domain of prevention, the following tasks may be indicated:

1. Legislative assistance, i.e. improvement of legal acts introduced in order to monitor both prevention and direct protection activities. These activities are connected with practical application of management.

2. Identification of events and processes associated with overbank stages and flood waves and determination of flood character and its risk. In this step, the following undertakings are also carried out: monitoring of the events mentioned, data processing and recording of flood losses. The data base, incorporating also spatial management, characteristics of environment in a catchment area and technical conditions of various flood-control facilities, should allow realization of the activities described below (points 3, 4, 5, 6) and serve as an important tool of direct protection actions.

3. Technical and scientific assistance for improvement of economic development in the area affected by flood danger, optimization of investments aimed in order to minimize the risk extent and to guarantee effectiveness of direct protection actions. This assistance has to be offered to planning, design and operation of buildings and facilities which are taken into account in investments, and also to other activities itemized in point 6.

4. Programming the investments aimed at elimination of flood danger, at gradual development and protection of environment in the area exposed to flood.

5. Realization of activities and investments described in points 3, 4.

6. Direct protection against flood, i.e. designing and updating the rescue plans, supplying equipment and tools necessary for rescue actions undertaken during flood and in the case of inundation. These tasks should be undertaken and supervised by efficient and well-run organizations.

Direct protection (defined above) consists in:

1. Minimizing the range and extent of inundation and reduction of losses caused by inundation. These tasks may be performed due to skilfull exploitation of reservoirs, rational operation of their retention capability and also due to regular inspection of technical parameters of embankments and other protective structures.

2. Protection of inhabitants, i.e. protection of their possessions, buildings and livestock, reduction of losses caused by breaks in communication and transport and protection of the elements and facilities of infrastructure in flooded area. The actions have also been undertaken to protect crops, to save forests, landscape and environment from damage and also to save buildings and goods of historical and cultural value.

Skilfull exploitation of the objects mentioned and continuous activities allowing us to control a flood will be effective, provided that the following conditions are fulfilled:

- cooperation of state and regional authorities, self-government, all public services (army, police, civil defence, municipal services, health service, mass media, meteo- and hydro-monitoring, etc), political and social organizations, economic and financial structures, organizations responsible for transport, communication, production of energy, etc,
- financial and technical means necessary for quick, co-ordinated and purposeful actions,
- wide education of people in order to improve the level of their real knowledge of

flood and their behaviour in emergency; these are associated with the support in preventive actions undertaken to minimize the danger of flood losses,

- establishment and development of insurance system enabling us to get a compensation for flood losses;
- repair of damages, compensation for flood damages.

This sequence of objectives and priorities results from the comprehensiveness of flood control. That comprehensiveness, in the light of the above targets, needs and circumstances, is evident.

### 3. REASONS FOR THE ANALYSIS OF BOTH WATER MANAGEMENT AND REGULATIONS OVER FLOOD CONTROL

Today in Poland, management and competence acquired by the institutions being responsible for water economics are controlled by the Water Act [14] passed in 1974. Regulations of this Act were adopted more than twenty years ago, therefore they are not appropriate for the present environment protection policy. They are not compatible with present concepts and trends of water resources management either. A proposal to initiate preparation of new Water Act was accepted at the beginning of the decade and a number of act versions were produced, but none passed by the Parliament.

At the end of the XX century, some basic priorities should be accepted by international authorities in order to: 1) manage the water economy according to respective legal regulations and 2) exert control over flood and rescue services.

The above is also valid in Poland where the problems defined have often been formulated, but their reconsideration is still required, because we should be aware of the relations between them and the disproportion between the present management of water resources and the future management which desperately requires a transformation. The following circumstances and important interactions have to be considered :

1. A serious delay in the reform of water economics management due to the interruption of legislative procedure introducing new Polish Water Act. The project of that new law was aimed at enforcing rules of management. The rules are based on the division of an area and the competence corresponding to hydrographic boundaries of river catchments.

2. Approving and setting in motion the policy which is aimed at partial changing and amending an old Polish Water Act (established in 1974), with old regulations being in force, instead of introducing a new Water Act associated with the set of new regulations. Under the circumstances, the need for the following regulations is obvious:

- a) compatibility between environment protection and sustainable development;
- b) nature and landscape conservation;

- c) complex spatial management;
- d) investment implementation, including planning, programming, design and selection of solutions;
- e) financial system organization and property relations.

However, there is observed a structural disproportion between these regulations.

3. The expected and officially announced transformation of state administration joined with the introduction of new competence and with establishment of new boundaries of administrative districts (with simultaneous reduction in the number of districts).

4. Such a general transformation creates new situation which should be taken into account in planning of water resources' management and flood prevention and protection.

5. The necessity of drawing the conclusions from the analyses of protective actions undertaken during the recent flood in July 1997 in the Odra and the Vistula catchment areas.

#### 4. HOW TO INTERPRET THE TERMS *FLOOD* AND *FLOOD CONTROL* ?

According to Polish Water Act [14] the responsibility for flood control rests on governmental administration and municipality. We should notice that in the Act there is no duty to *guarantee safety*, which ought to be interpreted as responsibility falling on all citizens, with public, social and economic organizations. Such an interpretation is justified by analogical rules in Polish Constitution [12] applied to environment protection. According to the Constitution:

- authorities execute the policy securing ecological safety for present and future generations,
- authorities are responsible for protection of environment,
- each citizen is obliged to take care of environment and is responsible for damage he causes to environment himself.

In other article of the Constitution, the responsibility of authorities for public safety and for protection of environment is clearly expressed and referred to a guarantee of human rights and to the rule of sustainable development.

Flood is interpreted as a disaster, because such a meaning of that term is accepted in Polish classical books devoted to those problems (LAMBOR [3], TUSZKO [8], MIKULSKI [4]). The term *disaster* is described in the State of Emergency Act [13] as: a very bad accident, in which a basic part of the country is affected by natural phenomena causing threat to a big number of people and their possessions. Those events may bring serious losses to national economy. In order to reduce these losses, we should undertake the protective actions allowing us to protect fundamental interests of the society and country.

Management of water resources (also flood control interpreted as a part of that management) is considered as an element of environment protection. Therefore we should ask the question: is the flood an unusual threat to environment or not? The answer is given in the definition of the term *environment* in Polish Act of Environment Shaping and Protection [16]:

Environment means the total of the external conditions (earth, water, air, animals and plants, landscape) that surround an organism, community or object. Environmental is subjected to transformations due to human activities.

This statement is supplemented in the same Act: unusual threat to environment is interpreted as the threat caused not by nature, but as an event that can cause serious damage or degradation. It is associated with extreme health and environmental hazards. The opinion presented in U'Thant's report can be considered as a comment on what is stated: the emphasis should be placed only on the consequences of human activities, thus natural events even if they affect people, e.g. storms, earthquakes, etc., are not taken into account (after PACZUSKI [5]).

However, those statements imply few doubts. A fragment of the book by JASTRZĘBSKI [2] can comment those doubts:

Probably legislator concerns the disasters as the results of natural processes being outside anyone's control. If he was right, we would not be able to understand all natural processes occurring in nature. It is generally known that we can control a flood by afforestation of upland and mountain lands, planting wastelands with trees and building of storage reservoirs. Droughts are very often caused by inappropriate land management. Moreover, elemental disasters such as floods seriously degrade environment because they are responsible for eluviation. Taking account of the above, I am in doubt about excluding the disasters from environment protection law by legislators.

Professor MIKULSKI (compare [4]) expresses opinion that each flood is caused by overbank stage. We can agree with this opinion, provided that inundations resulting from breaking flood embankments within depression areas are not considered as flood.

Under the circumstances we ignore the problem of responsibility for losses and damage and we focussed out attention on the similarity of both threats and rescue operation. The Polish Constitution [12] specifies two categories of emergencies: natural disaster and technical breakdowns resembling natural disaster. Serious losses caused only by adverse technical conditions of flood embankments may be equivalent to the damage associated with classical (natural) flood. Therefore it should be stated that clear definition and interpretation of flood, disaster or technical breakdown resembling natural disaster are not specified in Polish bibliography and in Polish legal regulations concerning general problems and water economics. Thus, clear definition of the above terms, their implementation and management become more and more important.



## 5. ESTIMATION OF FLOOD RISK IN LEGAL REGULATIONS

In the Polish Water Law [14] being in force, the following terms are used: areas threatened by flood, areas not protected by flood embankments and threatened by a direct flood risk. However, in the Law there is no clear interpretation of those terms and it does not precise the ways how to classify particular areas into categories mentioned. In the case of the areas bounded by river banks and protective embankments, the following operations are prohibited: to erect buildings and other structures, to store materials, to plant trees and shrubs, to change the shape of land surface, and to undertake any action resulting in difficulties with flood control. Only the works connected with regulation and maintenance of inland waters are not subjected to those constraints.

The state administration organ (in Polish law called voivode) is responsible for:

- establishing and cancelling analogical prohibitions for the areas which are not protected by embankments,
- specifying the way of a proper land use and kind of crops allowed to be planted in the area bounded by river banks and embankments.

In legal regulations, flood hazard for the areas protected by embankments is not taken into account. In "new" Water Act [21], we can find two new categories of flood hazard within the areas which are considered so far as safe and therefore not protected by embankments. These categories can be itemized as follows:

1. Direct hazard. It may arise in the areas between river channel and protective embankments, areas without embankments, areas of polders, areas near to sea shore, areas in depression.

2. Potential hazard. It may arise in the areas affected by threat of flood caused by damage of embankments and other hydraulic structures.

Estimating the risk and determining the boundaries of area threatened by flood are associated with flows whose volumes can be predicted. If the recognition of flood hazard is considered as a reliable factor in the plans of an area development, it has to be officially confirmed by administrative authorities. Distinct limitations imposed on the areas protected by embankments were not specified in the proposals mentioned, because in this case we have to establish the expected range of flood and to mark it on the plans of land development. As those plans are treated as the base for the decision on land use, the above requirements may be interpreted as rational development of the areas threatened by flood or inundation and application of appropriate protective means which should be controlled by land owner. Then the stress is laid on the acceptance of risk, which suggests that those types of facilities which may increase the cost of damage should not be localized in the areas threatened by flood or inundation. It refers to fuel stores, stacking yards and to such buildings as museums, libraries, hospitals, whose evacuation is difficult. The present land use should be known, stored in databases and applied in programs of prevention of and protection against flood losses. The database with all relevant information about the area

threatened by flood serves as the important tool of planning and performing the rescue actions undertaken to reduce the extent of inundation and flood losses.

## 6. PRESENT CONCEPTS IN WATER RESOURCES' MANAGEMENT VERSUS FLOOD CONTROL

In modern management of water resources, planning and its implementation, which are compatible with hydrographic boundaries of river catchment areas, have to be taken into account. In Polish Water Law, the principle of superiority in hydrographic division of area is accepted only in the domain of strategy definition, whereas the decisions about water using depend on administrative authorities and sometimes on local administration of a commune council. It means that strategic programming and the respective restrictions put on the users of water resources and investments are under control of state organizations. Those organizations are responsible for some areas whose boundaries have been established based on the division of the country area according to hydrographic boundaries of river catchments\*. However, the decisions on water supply and sewage effluent disposal consent given to particular consumers and users of water resources are still taken by local administration.

In Poland, the transformation in management of water resources was initiated with establishment of seven state institutions, called the Regional Water Authorities. In the Act [17] creating that organization of management, the areas subordinated to those institutions are designated and specified. Seven Regional Water Authorities located in Warsaw, Cracow, Katowice, Wrocław, Poznań, Szczecin and Gdańsk are, in turn, subordinated to the Ministry of Environment Protection, Natural Resources and Forestry. The state budget is the financial base of their activity.

The Regional Water Authorities deal with:

- formulation of programs and plans allowing better use of water resources and protection of their quality;
- information storage and construction of databases;
- drawing up guidelines and placing restrictions which should be taken into account when water supply and sewage effluent disposal consent is given by administrative authorities (those guidelines and restrictions are included in a special document called as conditions of the use of water in catchment area);

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\* In practical approach, the term *catchment* may be interpreted in different ways. In some cases, neglecting its physical meaning, the boundaries of area committed to management organizations are defined with regard to specific regional relations, borders, relations implied by objectives of water resources management, of water quality protection, etc. As the example: in Poland, the area of Upper Silesia (although located on both sides of watershed between the Odra and the Vistula catchments) is treated as hydrographic management unit.



- initiation of researches and studies, supporting of technical documentation necessary for large-scale investments which should optimize water resources management (this approach is both broad and detailed and allows taking account of the municipal water management, industry and agriculture);
- making decisions on water supply and sewage effluent disposal consent necessary for the investments allowing protection against flood;
- coordination of all actions connected with flood control (prevention and protection) in the catchment area.

However, it should be noted that the act appointing the Regional Authorities contains only brief definition of their competence but it does not precise their relations to other particular units of state and regional administration. This lack of clear regulations can lead to conflicts, which may also be caused by an evident incompatibility between the boundaries of areas subordinated to particular units of governmental administration and the boundaries of river catchments managed by the mentioned authorities.

## 7. RELATIONSHIPS BETWEEN FLOOD PREVENTION PLANNING OF MULTIPLE LAND USE AND FACILITIES DEVELOPMENT

In the principles of hazard evaluation to be introduced in "new" Water Act (compare chapter 5), a flood hazard has to be taken into account when the extension of facilities and land use in river valleys are planned. This means that the boundaries of the flood extent should be marked on the plans of spatial management of the areas threatened by inundations. Due to this undertaking, the development of house building and extension of facilities in the areas threatened by flood can be limited. Such development policy may decrease the losses caused by floods, which is well illustrated by the case known as Rapid City (United States, South Dakota) where after catastrophic flood of 1972 [9]:

*It was decided to relocate buildings and industry out of area suffered by flood danger. Damaged houses were liquidated, those yet usable were transferred to safe locations. In this action 1100 houses and 157 enterprises changed their addresses. Near to river, area of four streets width and of 8 km length was cleared and the city park and recreation facilities were there established. All plans of that area development were postponed to avoid any difficulties for case of extreme flows in river.*

The proposed strategy of proper control of development on the areas threatened by flood may work according to the rules formulated in the present Polish Water Act (1974, [14]). The regulations drawn up in this Act allow us to introduce restrictions on selected kinds of land use. Appropriate decisions have to be justified by risk assessment and associated with compensation paid for land owners. Effectiveness of that strategy cannot be estimated only in financial measures. In the context of this statement, an opinion given by G.F WHITE [9] ought to be considered:

*In the long run, flood plain land use management may be the single adjustment most likely to reduce national flood losses, although it is not certain that it would yield the largest net benefit to the nation. In the short run, the amount of damage reduction will be relatively low because of complications in removing existing properties from the path of flood waters. Nevertheless, structural measures, flood warnings, and flood proofing will be of little value if the reduction in damages that they accomplish is more than offset by new damage potential resulting from additional development in flood plains.*

During a decision-making it becomes necessary to consider also social advantages and costs resulting from development of the policy presented. Although calculation of costs is difficult, only a thorough analysis can lead to rational solutions. It should be stressed that I do not use the term *optimal solutions*, as I would like to prove that the best solutions are not equivalent to the cheapest solutions if life protection, environment protection and facilities protection are taken into account. If that strategy will be adopted we face a radical change in flood prevention. This may be realized due to the introduction of "new" Water Act [21] which deals with the relations between regulations over planning of land use and estimation of flood risk. The "new" Water Act has still not passed but in Polish regulations, which are actually in force, we find the statements which may be interpreted as the suggestion of application of the approach described above. One of them can be considered is as an important revision of a standard [6], i.e. Water Act of 1974, approved by Parliament in April of 1997. In this regulation, the rule called conditions for water use in catchment area was clearly defined as a very important tool of water resources management.

To make the explanation clear few remarks about conditions for water use in catchment area have to be given. Those remarks are about the documents to be prepared for all catchment areas of Poland and relating to clear identification of restrictions to be considered in decision on the water supply consent. The documents also interpret the definition of main goals, objectives, technical and financial measures carried out in order to manage the water resources in catchment areas. As indicated above these documents should to be prepared by Water Authorities supported by an approval of responsible ministry. The standard alteration of Water Act [6] institutes a superiority of conditions for water use... in relation to local (i.e. prepared by communes) programs of land use; however, we cannot find any equivalent confirmation of this relation in the respective regulations.

In Polish law applied to the town and country planning (act approved in 1994 [15]), there is authorization for the Ministry of Environment Protection, Natural Resources and Forestry. It allows identification of the requirements for the prognoses of the effects of the investments planned on environment. As the consequence of the authorization mentioned the Ministry lay down the regulation [18] which states that those prognoses have to take account of the constraints defined in the point conditions for water use.

In my opinion, the importance of this last regulation is decreased by the fact that it was published two years before instituting the superiority of conditions for water use in relation to plans of land use. Additional difficulties can arise because in many regions the plans of spatial management have already been completed, whereas conditions for water use are still prepared. An evident incompatibility of two documentations which are prepared for two schemes of area division (administrative and hydrographic) may also cause conflicts.

Moreover, we still have not any decisions on the way of establishing the conditions for water use and their contents. It means that the conditions do not present any derivatives how to plan the development of drainage area in terms of flood protection. Numerous experts differ in their opinions: some of them think that the conditions for water use should not be connected with a flood, while the other express an opposite viewpoint. I would like to state that the second opinion is rational: the documentation of the conditions has to transfer the interactions between water resources management and flood risk to plans of land use, it seems more advantageous to prepare one complete document than two or more, otherwise the problems stemming from flood risk would be transferred from plans of flood control to plans of land use. These plans are prepared by Water Authorities being responsible for their execution. The presented version of the conditions (i.e. including flood control problems) does not assume that the plan of flood control will be included in the conditions, but it states that the problems of prevention and investments should be excluded from the plan, because it ought to be oriented on protective and rescue actions to be undertaken in the case of flood or inundation.

As the other tool to be used for the transfer of problems dealing with flood risk to the plans of flood control, the analyses of interactions between spatial management and environment may be pointed. Those analyses are documents necessary for any kind of approval of each decision on large-scale investment. Scope of those documents was defined in regulation issued by the Ministry mentioned in 1995 [19]:

Those analyses should include estimation of the expected effects (direct and indirect, reversible and irreversible, short-term and long-term resulting from the use of natural resources and caused by other circumstances) on particular elements of environment, on human health and on landscape amenities. This document should also define advantages and disadvantages for other investors.

In my opinion, it would be better if the ordinance recommended to take account of the disasters and industrial accidents of a disaster nature. The same ordinance contains classification of hydraulic structures being important in flood protection. They can be classified as:

1. Structures specially harmful to environment and human health:
  - a) reservoirs of water surface area greater than  $2 \text{ km}^2$  or of total capacity greater than  $1 \text{ mln m}^3$ ,
  - b) dams of height greater than 8 m.
2. Structures that may cause environmental quality deterioration:

- a) inland waterways, water channels,
- b) flood-control works,
- c) reservoirs, dams or other structures allowing water lifting (the height of water above 3 m) and also long-term water storage.

The actual investment decisions can be taken, provided that they are preceded by analyses of interaction to environment being prepared by licensed experts. In such a way, the problems of disaster risk or of industrial accidents may be identified in project documentation. The probability of inundations, breaking of flood embankments or damage to water dams should be analysed.

Taking account of the above it becomes clear that regulations applied to flood protection are scattered in a great number of acts of law. It justifies the efforts made to review the acts of law and, after their analysis, to join them together in order to obtain a few condensed and clear acts.

As a summary of the above I would like to recall the objectives formulated in [10]. They were prepared for the World Conference on Natural Disaster Reduction organized in Yokohama (in 1974) under the auspices of the United Nations:

*All natural hazards posing a disaster risk should be identified and brought to the attention of decision makers, using standardized methodology, symbols and terminology for risk mapping. Areas should be classified according to their level of exposure to each type of natural disaster.*

*Legislative authorities at national, state or local level should establish the necessary legal framework for the implementation of mitigation measures, such as land-use planning, water and forest and building codes. Authorities should keep in mind that laws and codes not enforced are of little benefit.*

*National, state or local institutions responsible for the planning of general socio-economic development and infrastructure, the private sector and bilateral or multi-lateral development agencies all should give due consideration to the level of risk to natural hazard at the earlier stages of their decision making process.*

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PILNA POTRZEBA ANALIZY POLSKICH AKTÓW PRAWNYCH  
DOTYCZĄCYCH PREWENCJI I OCHRONY PRZED POWODZIĄ

Niedawna powódź lipcowa (1997) i poważne straty spowodowane zalewaniami, szczególnie w dorzeczu Odry, skłaniają nas do podjęcia działań w celu ochrony przed tego rodzaju klęską żywiołową i prewencji umożliwiającej ograniczenie ryzyka powodzi. Można to osiągnąć dzięki racjonalnej polityce rozwoju i zagospodarowania przestrzennego dolin rzecznych, a także przez przygotowanie bezpośredniej ochrony przed powodzią, podejmowanej w wypadku wystąpienia zagrożeń i podczas powodzi. Skuteczność prewencji i ochrony bezpośredniej winna opierać się na systemie kompleksowych legislacji oraz przyjętej strategii racjonalnego rozwoju gospodarki przestrzennej. Przedmiotem artykułu są aktualnie obowiązujące akty prawne i ich interpretacja. Uzasadniono potrzebę transformacji systemu prawnego regulującego całokształt prewencji i ochrony przed powodzią. Opisano aktualną interpretację prewencji i ochrony przed powodzią w polskim prawie. W artykule nawiązano do koncepcji sformułowanych w dokumentach Światowej Konferencji Ograniczania Klęsk Żywiołowych zorganizowanej w Yokohamie w maju 1994 roku pod auspicjami Organizacji Narodów Zjednoczonych.

